



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/500,706	02/09/2000	Srinivasan K Ganapathi	61450	2981

7590 03/13/2002

Pillsbury Madison & Sutro LLP  
David S Jakopin  
1100 New York Ave NW  
Ninth Fl East Tower  
Washington, DC 20005

EXAMINER

DAVIS, OCTAVIA L

ART UNIT PAPER NUMBER

2855

DATE MAILED: 03/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
09/500,706

Applicant(s)  
Ganapathi

Examiner  
Octavia Davis

Art Unit  
2855



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Jan 4, 2001
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-61 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-61 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some\* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_ 20) ☐ Other: \_\_\_\_\_

Serial Number: 09/500, 706

Art Unit: 2855

3/9/02

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 46 is rejected under 35 U.S.C. 112, 2nd paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as his invention.

Claim 46 is an improper method step claim because it improperly refers back to “ the method ” of independent claim 41.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 - 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gurney et al ( 8377 ) in view of Chen et al, and Teruhiko. Gurney et al ( 8377 ) disclose a method and apparatus capable of sensing pressure comprising the steps of providing a sensing device with a sensor including a plurality of layers, the plurality of layers comprising a non-magnetic conducting layer 79 disposed between a magneto resistive layer 77, the magneto resistive layer having a non-zero magnetostriction such that the resistance of the magneto resistive layer will change upon the application of pressure causing the magneto resistive layer to change and thereby result in a change in resistance, the sensor also including a ferromagnetic biasing layer 81, the non-magnetic conducting layer 79 disposed on the ferromagnetic biasing layer 81 and the magneto resistive layer 77, and the sensor being disposed on a support structure and a substrate 61, the support structure being smaller than the substrate ( See Cols. 5 and 6, lines 40 - 65 and 1 - 43 ) ( cls 1, 9, 18, 29, 38, 46, 47 and 56 ), the nonmagnetic conducting layer including Tantalum ( cls 11 and 31 ), the biasing layer including one of an alloy of NiFeCr and a laminated layer of CoTaZr and NiFeCr ( See Col. 7, lines 10 - 24 ) ( cls 12, 14, 32 and 34 ), the magneto resistive layer including a nickel alloy ( cls 13, 15, 16, 33, 35 and 36 ), the thickness of each of the ferromagnetic biasing layer, the nonmagnetic conducting layer and the magneto resistive layer being within a specific range ( See Col. 6, lines 20 - 67 ) ( cls 17 and 37 ), an underlayer 82, Ta being disposed between the support structure and the ferromagnetic biasing layer ( cls 19

and 39 ) and the underlayer comprised of Tantalum ( cls 20 and 40 ) and the magnetostrictive sensor being an AMR and a GMR sensor ( cls 48, 49 and 57 - 61 ) but does not disclose the sensing device including a plurality of sensors that are formed in a two dimensional array and operate as the one sensor so that each sensor detects the pressure of an area associated with that sensor and a nonmagnetic conducting layer disposed between a magnetoresistive layer and a ferromagnetic layer ( cls 1, 21, 41, 42, 45, 47 and 56 ), sensing an initial and a reference resistance, immediately prior to or immediately following, of the device when the ferromagnetic layers are in the biased state without the application of pressure ( cl 43 ), determining the pressure applied to the sensing device using both the initial resistance and the sensed resistance in order to minimize the influence of external conditions on the determined pressure ( cl 44 ), the support structure being a membrane and deformable beam formed of semiconductor layers ( cls 2, 3, 8, 22, 23, 28, 50, 51 and 59 ), the deformable beam being formed of a conductor ( cls 4, 24 and 52 ), the beam having a length between 2 microns to several hundred microns ( cls 5, 10, 25 and 53 ), the beam having a thickness ranging from 0.1 microns to 20 microns ( cls 6, 26 and 54 ), the beam having a width ranging from 1 micron to several microns ( cls 7, 27 and 55 ) and each sensor having a length of 1 micron to several hundred microns ( cl 30 ).

However, Chen et al disclose a magnetoresistive sensor 30 comprising a nonmagnetic conducting layer 39 disposed between a magnetoresistive layer 36 and a ferromagnetic

layer 37 ( cl 41 ), sensing an initial and a reference resistance immediately prior to or immediately following, of the device when ferromagnetic layers 37, 65 are in a biased state without the application of pressure ( See Cols. 5 and 6, lines 1 - 23 and 28 - 36 ) ( cl 43 ) and determining the pressure applied to the sensing device using both the initial resistance and the sensed resistance in order to minimize the influence of external conditions on the determined pressure ( cl 44 ) ( cls 41, 43 and 44 ). Gurney et al ( 6617 ) disclose an atomic force microscope system comprising means for deforming and patterning a support structure 23 which constitutes a membrane and a microfabricated deformable beam ( See Col. 6, lines 39 - 48 ) ( cls 2 - 8, 10, 22 - 27, 30, 50 - 53, 55 and 59 ). Teruhiko discloses a surface panel comprising a sensing device which includes a plurality of detectors 44 that are formed in a two dimensional array and operate as the one sensor so that each sensor detects the pressure of an area associated with that sensor ( See Cols. 4 and 5, lines 56 - 57 and 1 - 1 - 17 ) ( cls 1, 21, 41, 42, 45, 47 and 56 ).

Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to modify Gurney et al ( 8377 ) according to the teachings of Chen et al, Gurney et al ( 6617 ) and Teruhiko for the purposes of, providing a thin and conductive MR conductive lead structures having enhanced mechanical strength, providing an improved magneto resistive sensor wherein the ferromagnetic sensing layer is a laminated layer of two ferromagnetic films and providing an inexpensive

structure that is capable of detecting complicated surface contours.

*Response to Arguments*


Applicant's arguments with respect to these claims have been considered but are moot in view of the new grounds of rejection.

Any inquiry concerning this communication should be directed to Examiner Octavia Davis at telephone number ( 703 ) 306 - 5896. The examiner can normally be reached on Monday - Friday ( 9:00 - 5:00 ), alternate Mondays off.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is ( 703 ) 308 - 0956.

OD

OD/2855

  
Benjamin R. Fuller  
Supervisory Patent Examiner  
Technology Center 2800